Figure 1

Figure 2

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AUS920010142US1
Method and Apparatus for Isolating Failing
Hardware in a PCI Recoverable Error
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To & From PCI Host Bridge

Terminal Bridge
200

Output Data
Buffer
206

Input Data
Buffer 208

Control State
Machine
202

EEH
204

To & From PCI I/O Adapter

Figure 3

308

312

Error log

Diagnostic
process

Operating System

302

310

Kernel service

Device driver

306

RTAS
300

Hardware
304

Figure 4

Arndt et al.
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Method and Apparatus for Isolating Failing
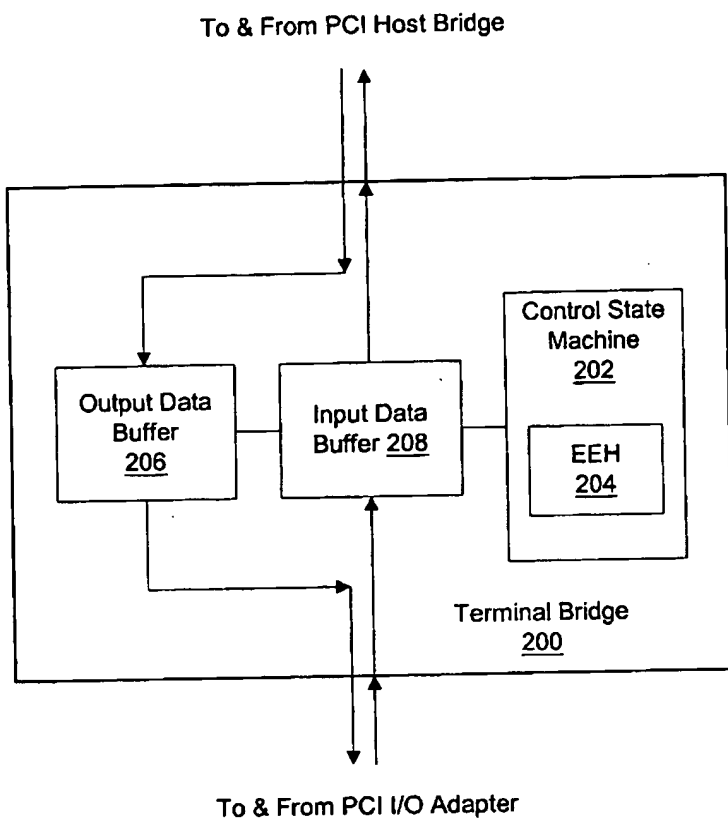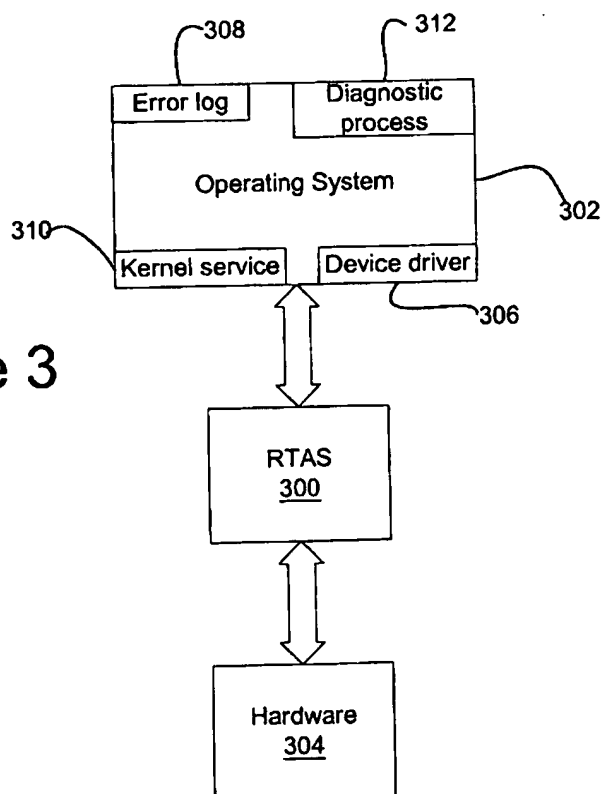Hardware in a PCI Recoverable Error
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Start

System started or PCI adapter hot-plugged into its slot
400

If error count for adapter in operating system device driver =0, set error count to zero
402

PCI adapter operation performed
404

PCI Recoverable error detected by hardware?
406

No → Yes

Device driver logs an error to system without detailed fault isolation. Device Driver resets PCI slot to allow operation to be retried if EEH stopped state was detected.
418

Recoverable error is reported as a target or master abort?
408

No → Yes

Device Driver increment count of errors
410

Threshold of allowed errors exceeded?
412

No → Yes

Device driver logs error information and ends usage of the adapter
416

End

Device driver makes firmware call to mark PCI slot as permanently unavailable.
414

End

Hardware stops slots returning all "1's" for any read
420

Device driver detects possible EEH stop state (all "1's" return), and query terminal bridge
422

EEH stop state?
424
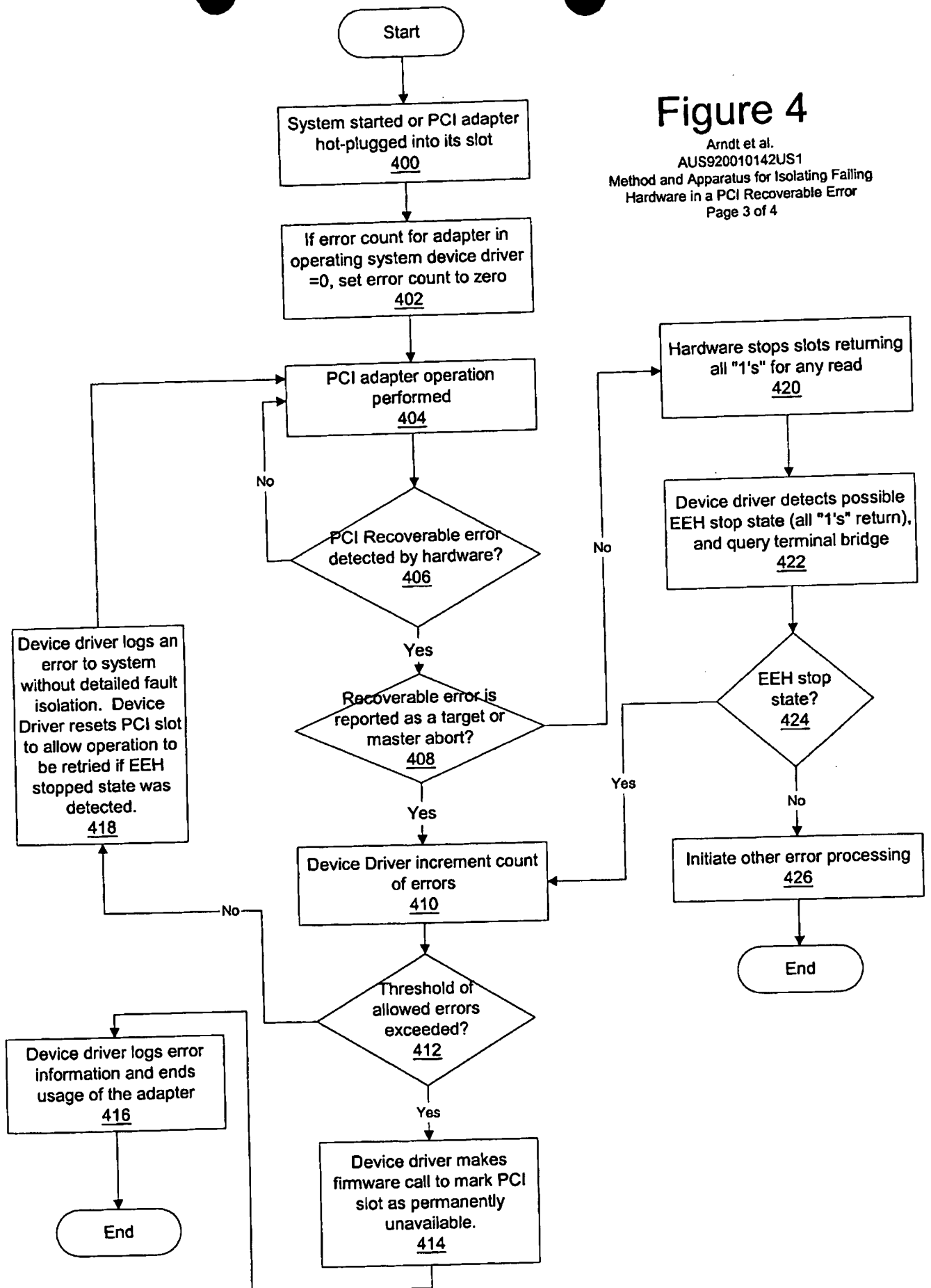
No → Yes

Initiate other error processing
426

End

Figure 5

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```
          ( Start )
              |
              v
  +-----------------------+
  |   Receive call from   |
  | device to place driver|
  | slot unavailable state|
  |          500          |
  +-----------------------+
              |
              v
  +-----------------------+
  |    Query hardware     |
  |  component in slot for |
  |   fault information   |
  |          502          |
  +-----------------------+
              |
              v
  +-----------------------+
  |     Place slot in     |
  | permanent reset state |
  |          504          |
  +-----------------------+
              |
              v
  +-----------------------+
  | Return fault information|
  |   to device driver    |
  |          506          |
  +-----------------------+
              |
              v
           ( End )
```
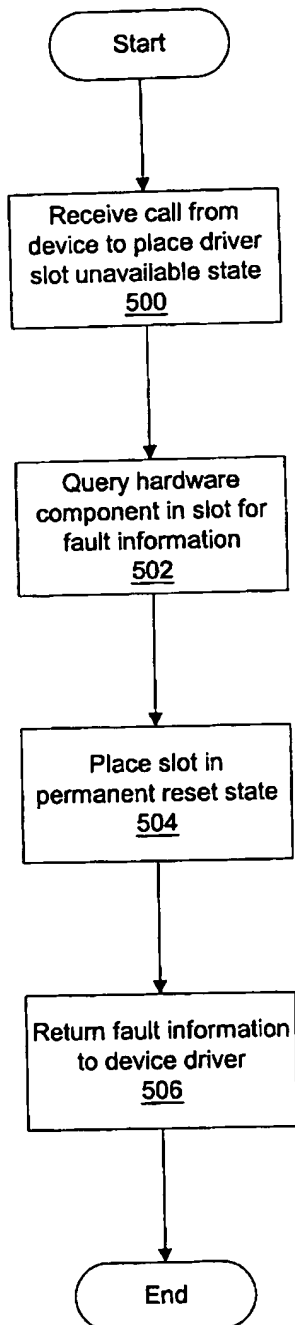
Figure 6

```
           ( Start )
               |
               v          No
          /\---------+
         /  \        |
   Detect    \       |
  replacement of >---+
    device?
     600
         \  /
          \/
           |
          Yes
           |
           v
  +-----------------------+
  |    Reset slot to      |
  |   available state     |
  |          602          |
  +-----------------------+
           |
           v
         ( End )
```